# 9. NONRADIONUCLIDE-CONTAMINATED SOIL/SEDIMENT RELEASE SITES

Remedial action is required for three nonradionuclide-contaminated soil/sediment release sites: the Burn Pits (TSF-03 and WRRTF-01) and the Fuel Leak (WRRTF-13) (see Figures 9-1 and 9-2). Releases at these sites may pose an imminent and substantial endangerment to human health and the environment. The site characteristics, including the nature and extent of contamination, the summary of site risks, remedial action alternatives, and the selected remedy, are presented for these sites.

A fourth nonradionuclide-contaminated soil/sediment release site, the Mercury Spill Area (TSF-08) (see Figure 9-2), was selected to be used for a treatability study to evaluate plant uptake factors and rates for phytoremediation. This site is a concern due to an elevated HI should residential use occur at the site. This HI is a result of mercury contaminated soils being brought to the surface for gardening and ingestion of these crops. There is an uncertainty regarding an INEEL specific uptake of mercury by plants. Accordingly, WAG 10 will perform additional studies of this site to determine this uptake and a revised risk analysis will be conducted from the site specific data. More detailed information about the nonradionuclide-contaminated soil/sediment release sites can be found in the OU 1-10 RI/FS Report (DOE-ID 1997b). At the completion of this treatability study, if additional remedial action is necessary, this will be documented in a separate decision document and will be performed by WAG 1.

## 9.1 Burn Pits

The two Burn Pits (TSF-03 and WRRTF-01) were used for open burning of construction debris. The TSF-03 Pit was used from 1953 to 1958; the four WRRTF-01 Pits were used from 1958 to 1975. Because of the similarities between the two sites, they were evaluated together.

The TSF-03 Burn Pit is located in the northeast corner of the TSF, outside the facility fence. The surficial boundary dimensions are estimated to be 7.9 by 19.5 m (26 by 64 ft) and is covered with approximately 0.6 to 1.8 m (2 to 6 ft) of clean soil, which eliminates the potential for worker exposure.

The WRRTF-01 Burn Pits are approximately 823 m (2,700 ft) north of WRRTF, outside the facility fence. The total surficial boundary dimensions of this site is estimated to be 122 by 50 m (400 by 164 ft) and is covered with approximately 15 cm to 3 m (6 in. to 9 ft) of clean soil and revegetated.

The Burn Pits are contaminated with lead. While lead does not present a risk that can be calculated using risk guidelines, the EPA has established a residential screening level to address the human health risk caused by lead. Contamination within the top 3 m (10 ft) of soil could be a risk to a hypothetical future resident if the subsurface soil was disturbed and brought to the surface. Recent investigation into available records indicates that other toxic substances, such as beryllium, chlorinated solvents, and used oils, were burned in the pits.

Currently, the Burn Pits are administratively controlled with signs identifying them as CERCLA sites. No activities can be performed without contacting the INEEL Environmental Restoration Program. The purpose of these controls is to keep worker exposures ALARA, and to prevent the spread of contaminated soil. The controls reduce current and future occupational exposure at the site to acceptable levels.

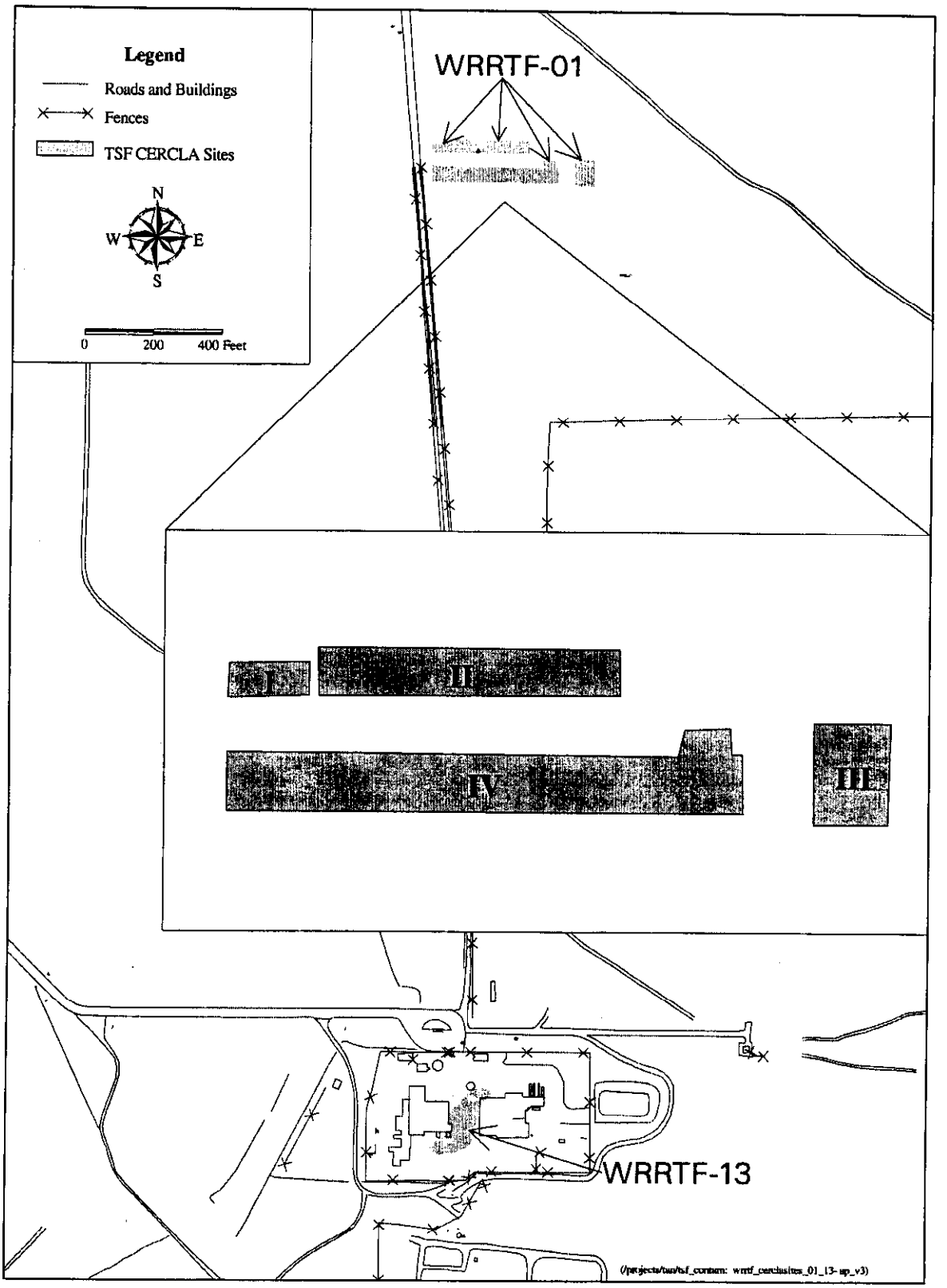


**Figure 9-1.** The WRRTF nonradionuclide-contaminated release sites.

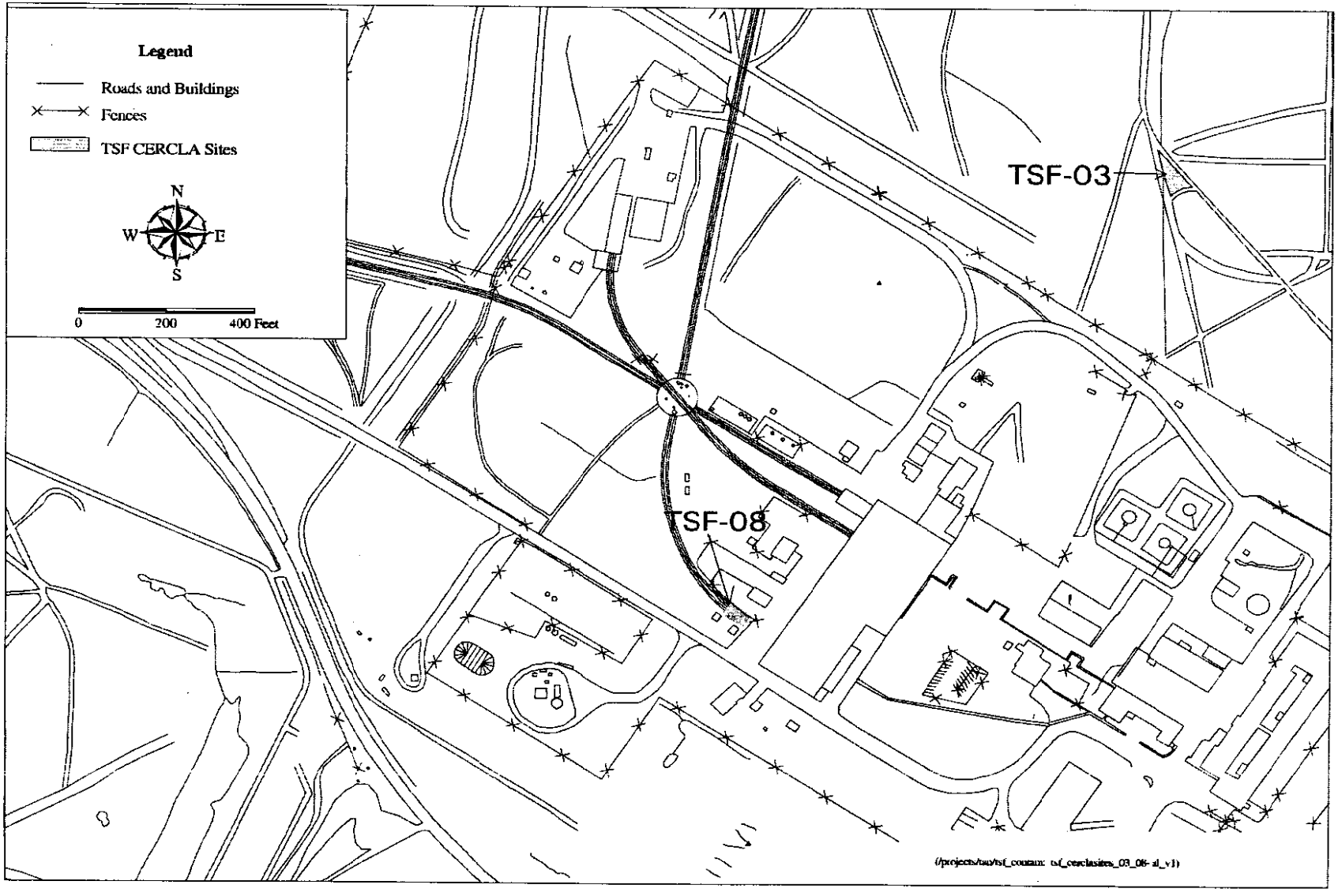


**Figure 9-2.** The TSF nonradionuclide-contaminated release sites.

### 9.1.1 Summary of Site Risks

A HHRA and an ERA were conducted for the two Burn Pits. Calculation of numeric health risk values for lead is not possible. Instead, the EPA residential screening level for lead was used to determine the need for cleanup. Since lead concentrations at these sites are greater than the 400 mg/kg, an imminent and substantial endangerment to human health and the environment may exist. A more detailed discussion of the methods used in the risk assessment process is presented in Section 6 of this ROD. Detailed information about the results of the Burn Pits HHRA and ERA are presented in Sections 6 and 7 of the OU 1-10 RI/FS Report and Section 5 and 6 of the FS Supplement.

***9.1.1.1 Human Health Risks.*** No contaminants were detected at the Burn Pits that would produce calculated risks greater than or equal to 1 in 10,000 or calculated HIs greater than 1; however, lead was detected at the pits at concentrations greater than EPAs 400 mg/kg residential cleanup level.

***9.1.1.2 Environmental Risk Assessment.*** The Burn Pits were identified in the ERA as having an ecological risk (i.e., III) greater than the threshold level of 1. The Burn Pits will also be considered under a Site-wide program to ensure they do not pose an unacceptable threat to ecological receptors at a population level. The WAG 10 Site-wide ERAs will incorporate the results of the WAG 1 assessment to evaluate the potential effect of the sites at the population level.

### 9.1.2 Summary of Alternatives

In accordance with CERCLA Section 121, the OU 1-10 FS identified and evaluated remediation alternatives. Any selected alternative had to achieve the remediation goal of 400 mg/kg for lead. In addition to the "No Action" alternative, four alternatives were evaluated to remediate the Burn Pits:

- Alternative 1: Limited Action
- Alternative 2: Native Soil Cover
- Alternative 3: Excavation and Disposal
- Alternative 4: Excavation and Soil Washing.

Details of the alternatives considered and the evaluation process are included in Sections 10 and 11 of the OU 1-10 RI/FS Report and Sections 5 and 6 of the FS Supplement.

***9.1.2.1 Alternative 1, Limited Action.*** Under Alternative 1, existing management practices would continue. Fencing and institutional controls (signs and disturbance controls) would also be implemented. The cost for this alternative is $3.0 million.

Alternative 1 would accomplish the site RAOs in a long timeframe because contamination would be left in place. To accomplish the RAOs, long-term institutional controls must be implemented to protect future occupational and residential land use. Institutional controls are a primary component of this alternative.

Alternative 1 would comply with the regulations and protect human health and the environment after the period of institutional control. Under Alternative 1, contamination would be left in place, resulting in low long-term effectiveness. This alternative would not reduce toxicity, mobility, or volume through treatment. Because the management practices are already in place, implementability would be

high. Short-term effectiveness would be high, because no handling or transport of contaminants would be required.

***9.1.2.2 Alternative 2, Native Soil Cover.*** Under Alternative 2, a uniform layer of clean soil and surface vegetation or rock would be added to limit direct contact with contaminated soil. Environmental monitoring would be conducted and institutional controls maintained to preserve the protectiveness of this alternative. The cost for this alternative is $4.9 million.

Alternative 2 would accomplish the site RAOs in a short timeframe because covers can be completed in a short time. To maintain the RAOs, long-term institutional controls must be implemented to protect future occupational and residential land use.

Alternative 2 would protect human health and the environment and comply with the regulations. Contamination would be left in place and contained. This alternative would not reduce toxicity, mobility, or volume through treatment; however, the cap would prevent contact to lead contamination and mobility would be reduced. There would be a possibility for worker exposure during construction of the cover, reducing the short-term effectiveness. Implementability would be high, given the INEELs success using soil covers.

***9.1.2.3 Alternative 3, Excavation and Disposal.*** Under Alternative 3, contaminated soil exceeding the remediation goal would be removed and disposed. The excavation would be backfilled with clean soil. Two variations of Alternative 3 were considered. Under Alternative 3a, the contaminated soil would be disposed of off the INEEL, while under Alternative 3b, the contaminated soil would be disposed on the INEEL. For both variations, it is assumed that no treatment would be required. The costs for these alternatives are $13.9 and $6.0 million, respectively.

Alternative 3b would use sampling and analysis before excavation to determine whether the soil meets disposal criteria or requires treatment. Treatment options would be evaluated based on characterization data.

Both variations of Alternative 3 would accomplish the site RAOs in a short timeframe because contamination would be permanently removed. It is expected that no institutional controls would be required after the remedial action, but would be verified by confirmational sampling.

Both variations of Alternative 3 would protect human health and the environment and would comply with the regulations. Long-term effectiveness would be high because the contaminants would be removed. Both variations of Alternative 3 would not reduce toxicity, mobility, or volume of the contaminants through treatment unless treatment to meet waste acceptance criteria is required. There would be a possibility for worker exposure during excavation and transportation to the disposal facility, reducing the short-term effectiveness. Implementability would be high since reliable technologies are available for excavation and treatment.

***9.1.2.4 Alternative 4, Excavation and Soil Washing.*** Under Alternative 4, all contaminated soil would be excavated. Clean soil cover at the sites would be removed and stockpiled so that contaminated soil would be accessible. Lead-contaminated soil would be treated onsite using a soil washing technology and the treated soils would be returned to the excavation. The soil washing technique is assumed to be effective on the lead-contaminated soil at the sites; however, a treatability study to evaluate the technical feasibility of this alternative would be required. The cost for this alternative is $18.3 million.

Alternative 4 would accomplish the site RAOs in a short timeframe because contamination would be permanently removed. It is expected that no institutional controls would be required after the remedial action, but would be verified by confirmational sampling.

Alternative 4 would protect human health and the environment and would comply with the regulations. Long-term effectiveness would be high because the contaminants would be removed. There would be a possibility for worker exposure during excavation and treatment activities, reducing the short-term effectiveness. Implementability would be difficult because a soil-washing treatability study would have to be conducted on the INEEL soil to further evaluate its technical feasibility.

### 9.1.3 Summary of Comparative Analysis of Alternatives

The following sections summarize the evaluation of the candidate remedial alternatives according to the criteria identified in Section 7.1.3 of this ROD. Detailed comparative analyses can be found in Section 12 of the RI/FS Report (DOE-ID 1997b) and Section 6.2 of the FS Supplement (DOE-ID 1998c).

***9.1.3.1 Threshold Criteria.*** The two threshold criteria, which must be satisfied by the selected remedy, are overall protection of human health and the environment, and compliance with ARARs. All of the alternatives considered for the Burn Pits (Alternatives 1, 2, 3a, 3b, and 4) meet the threshold criteria.

***9.1.3.2 Balancing Criteria.*** The five balancing criteria are: (1) long-term effectiveness and permanence, (2) reduction of toxicity, mobility, or volume through treatment, (3) short-term effectiveness, (4) implementability, and (5) cost.

Alternatives 3a, 3b, and 4 best satisfy the criterion of long-term effectiveness because all contamination would be removed. Alternative 2 partially satisfies long-term effectiveness because contamination would be left in place, yet still contained. Alternative 1 least satisfies long-term effectiveness because contamination would be left in place. Reduction of toxicity, mobility, or volume through treatment is partially satisfied by Alternatives 3b and 4; both would potentially use treatment. Alternatives 1, 2, and 3a least satisfy the reduction criteria because they do not reduce toxicity, mobility, or volume in any way. Alternative 1 best satisfies short-term effectiveness because workers will not be exposed to contamination. Alternatives 2, 3a, 3b, and 4 partially satisfy short-term effectiveness because there is the potential for worker exposure with each of these alternatives. Implementability is best satisfied by Alternatives 1, 2, 3a, and 3b because of past success and knowledge of these alternatives. Implementability of Alternative 4 would be partially satisfied because a soil-washing treatability study would have to be conducted. Alternative 1 has the lowest estimated cost and Alternative 4 has the highest estimated cost.

***9.1.3.3 Modifying Criteria.*** The modifying criteria, used in the final evaluation of remedial alternatives, are state and community acceptance. State acceptance is demonstrated by IDHW concurrence with the selected remedial alternative and signature of this ROD. The IDHW was involved in the development and review of the RI/FS Report (DOE-ID 1997b), the Proposed Plans (DOE-ID 1998a and DOE-ID 1998b), the FS Supplement (DOE-ID 1998c), this ROD, and other project activities such as public meetings.

For community acceptance, the factors that are considered include which elements of the alternatives interested persons in the community support, have reservations about, or oppose. The comments received on the Proposed Plan form the record of these opinions and concerns.

Comments were largely unsupportive of the selected remedy because the remedy originally did not remove or treat contaminants. However, the Agencies are moving forward with a revised remedy, as a response to the comments, which includes additional sampling that will determine if there are other COCs. If so, and it is cost effective, then the contingent remedy will involve soil removal and disposal. The Responsiveness Summary (Part III) portion of this ROD documents the full range and content of the public comments received regarding the recommended action at this site.

### 9.1.4 Selected Remedy: Alternative 2, Native Soil Cover

Based on consideration of the requirements of CERCLA, detailed analysis of alternatives, and public comments, the Agencies selected Alternative 2, Native Soil Cover, as the remedy for the two Burn Pits. The selected remedy will satisfy the NCP requirements for the low-level threat posed by the Burn Pits. The major components of the selected remedy include:

- Sampling to determine the cover design and monitoring requirements, and to ensure the remedy is protective of human health and the environment
- Comparing cost of the soil cover and long-term monitoring with the excavation and disposal option
- If the soil cover option is selected, adding uniform layers of clean soil and surface vegetation to limit direct contact with contaminated soil
- Inspecting of existing institutional controls to assess the adequacy and need for additional controls.

The selected remedy addresses the risk posed by the Burn Pits by effectively preventing access to the area and exposure to contaminated media.

The native soil cover is intended to provide a standoff cover to support run-on and runoff control and be less permeable then the underlying soil. For costing purposes it was assumed that this cover would be 3 m (10 ft) of clean INEEL native soils above areas with soil concentrations above FRGs. Alternative 2 will use sampling and analysis to assess the Burn Pits for additional COCs that may have not been properly evaluated during the RI. If the sample analyses indicate that additional contaminants are present, and a cover cannot be designed cost effectively to be protective based on the presence of these contaminants, and it is more cost effective to excavate and dispose of the waste, then this will be the selected alternative. The costs associated with the contingent alternative are not included in the cost estimate. The following paragraphs detail the selected remedy.

The native soil cover is intended to provide a standoff cover of clean INEEL native soils. The cover would be integrated into the natural surrounding grade. The depth of the soil cover will be such to ensure protectiveness of human health and the environment and will be designed in the remedial design/remedial action (RD/RA) phase. The surface of the soil cover would be vegetated to limit infiltration and erosion. Site-specific considerations would be used to design the optimum configuration.

Conventional earthmoving equipment would be used for cap construction. Exposure to lead in soils would be minimized during construction activities through the use of personal protective equipment and engineering controls. Surface water controls would be implemented during construction.

Environmental monitoring (air, soil, and groundwater, as applicable) and cap integrity monitoring and maintenance (repairing any observable degradation including cracks, erosion, and biotic intrusion) would be conducted on a periodic basis as part of this alternative. Institutional controls will be implemented as part of this remedy. Current management practices, such as restricting activities conducted at the sites without clearance from INEEL Environmental Restoration Program, would continue. Five-year site reviews would be conducted to evaluate the effectiveness of the native soil cover and the need for additional environmental monitoring or institutional control requirements, as necessary. Additional information about the institutional controls is in Section 12.

At the WRRTF-01 Burn Pits, a native soil cover of clean INEEL soil would be placed over the extent of Pits I, II, and IV, an area of approximately 122 by 50 m (400 by 164 ft). The depth of the soil cover will be such to ensure protectiveness of human health and the environment and will be designed in the RD/RA phase. This soil will prevent direct exposure to the contaminants and will be compacted so that it is less permeable than the underlying material to prevent infiltration from creating a bathtub effect. The extent of the native soil cover would not need to encompass Pit III because lead was not detected at levels above the preliminary remediation goal (PRG).

At the TSF-03 Burn Pit, a native soil cover of clean INEEL soil would be placed over the extent of the Burn Pit, an area of approximately 8 by 10 m (26 by 64 ft). The depth of the soil cover will be such to ensure protectiveness of human health and the environment and will be designed in the RD/RA phase. This soil will prevent direct exposure to the contaminants and will be compacted so that it is less permeable than the underlying material to prevent infiltration from creating a bathtub effect. Some changes may be made to the remedy as a result of the remedial design and construction process that result from the engineering design process.

***9.1.4.1 Estimated Costs for the Selected Remedy.*** The estimated capital and maintenance costs for implementing the selected remedy for the Burn Pits is $4,898,412. The costs are presented in net present value, which allows for equal comparison of long-term and short-term alternatives while factoring in inflation. Details of the cost estimates are presented in Appendix J of the RI/FS Report and summarized in Table 9-1.

***9.1.4.2 Protection of Human Health and the Environment.*** The selected remedy is expected to be protective of human health and the environment. RAOs will be achieved by providing a standoff cover of clean INEEL soils, combined with environmental monitoring and institutional controls. Preventing contamination exposure to a hypothetical future resident is key to meeting RAOs and maintaining risk below acceptable levels.

***9.1.4.3 Compliance with ARARs.*** The selected remedy will meet the potential ARARs as summarized in Table 9-2. Contingency remedy ARARs for this site are summarized in Table 9-3. After the institutional control period, ARARs and TBCs will be met by imposing restrictions.

***9.1.4.4 Cost Effectiveness.*** The selected remedy is cost-effective because it provides overall effectiveness in meeting the RAOs proportionate to its costs. When compared to other potential remedial actions, the selected remedy provides the best balance between cost and effectiveness in protecting human health and the environment.

**Table 9-1.** Cost estimate summary for the Burn Pits (TSF-03 and WRRTF-01) selected remedy.

| | | $ Fiscal Year (FY)-97 |
|---|---|---|
| FFA/CO Management and Oversight | | |
| | WAG 1 – Management | 425,556 |
| Remediation Oversight | | |
| | Construction Oversight | 207,418 |
| | Construction Project Management | 345,696 |
| | Remedial Action Document Preparation | 48,466 |
| | Remedial Action Report | 21,760 |
| | Packing, Shipping, Transportation Documentation | N/A |
| | WAG-Wide Remedial Action 5-Year Review | 78,947 |
| Remedial Design | | |
| | Title Design Construction Document Package | 30,720 |
| | Remedial Design Documentation per WAG 1 Baseline | 63,856 |
| | Prefinal Inspection Report | 16,000 |
| Remedial Action | | |
| | Soil Cap Construction | 818,000 |
| | Access Restriction Fencing | 57,000 |
| | Surface Water Diversion Ditches | 11,400 |
| | Subcontractor Indirect Costs | 680,755 |
| CAPITAL COST SUBTOTAL | | 2,805,574 |
| | Contingency @ 30% | 841,672 |
| TOTAL CAPITAL COST IN FY-97 DOLLARS | | 3,647,246 |
| TOTAL CAPITAL COST IN NET PRESENT VALUE | | 3,352,940 |
| Operations | | |
| | WAG 1 – Management | 1,251,051 |
| | Annual Operations and Maintenance Reports | 150,000 |
| Decontamination and Dismantlement | | N/A |
| Surveillance and Monitoring | | 1,716,200 |
| OPERATION & MAINTENANCE (O&M) COST SUBTOTAL | | 3,117,251[a] |

**Table 9-1.** (continued).

| | $ Fiscal Year (FY)-97 |
|---|---|
| Contingency @ 30% | 935,175 |
| TOTAL O&M COST IN FY-97 DOLLARS | 4,052,427 |
| TOTAL O&M COST IN NET PRESENT VALUE | 1,545,472 |
| TOTAL PROJECT COST IN NET PRESENT VALUE | 4,898,412 |

a. O&M was calculated using 100 years of maintenance and a discount rate of 5%.

**Table 9-2**. ARARs for the Burn Pits (TSF-03 and WRRTF-01) selected remedy.

| | Citation | Reason |
|---|---|---|
| **Chemical-Specific ARARs** | | |
| Rules for the Control of Air Pollution in Idaho | "Toxic Substances" IDAPA 16.01.01.161 | The release of carcinogenic and noncarc contaminants into the air must be monit controlled if necessary, during construct cover and installation of the groundwate system. |
| | "Toxic Air Emissions" IDAPA 16.01.01.585 and .586 | |
| Idaho Groundwater Quality Rule (Primary Drinking Water Standards | IDAPA 16.01.11.200 | Leachate from this site must not adverse groundwater quality; standards for grou quality must be met. |
| **Action-Specific ARARs** | | |
| Rules for the Control of Air Pollution in Idaho | "Fugitive Dust" IDAPA 16.01.01.650 and .651 | Requires control of dust generated durin of the soil cover and installation of the g monitoring system. |
| Idaho Solid Waste Management Rules and Standards | "Landfills" IDAPA 16.01.06.006.02(a), .03(b), .04, .05, and .06(b) | If additional analysis indicates the waste not RCRA hazardous, then the pits will maintained in accordance with the Idaho landfill regulations. |
| Resource Conservation and Recovery Act (RCRA) – Standards Applicable to Generators of Hazardous Waste | "Hazardous Waste Determination" IDAPA 16.01.05.006 (40 CFR 262.11) | A HWD must be made for any waste ge construction of the soil cover and install monitoring system. |
| | "Manifest" IDAPA 16.01.05.006 (40 CFR 262 Subpart B) | Required for any hazardous waste gener construction of the soil cover and install monitoring system that has to be sent of treatment and/or disposal. |

**Table 9-2.** (continued).

| | Citation | Reason |
|---|---|---|
| | "Pre-Transportation Requirements"<br>IDAPA 16.01.05.006<br>(40 CFR 262.30 – 262.33) | |
| RCRA – Standards for Owners and Operators of Hazardous Waste Treatment Storage and Disposal Units | "General Waste Analysis"<br>IDAPA 16.01.05.008<br>(40 CFR 264.13 (a)(1-3)) | Analysis requirements apply to seconda generated during construction of the co installation of the groundwater monitori required. |
| | "Security of Site"<br>IDAPA 16.01.05.008<br>(40 CFR 264.14) | If the waste in the pits is determined to l hazardous through additional sampling a measures must be taken to restrict acces during construction and the postclosure |
| | "General Inspections"<br>IDAPA 16.01.05.008<br>(40 CFR 264.15) | If the waste in the pits is determined to l hazardous through additional sampling a regular inspections must be performed. |
| | "Personnel Training"<br>IDAPA 16.01.05.008<br>(40 CFR 264.16) | All personnel involved in construction c and installation of the groundwater mon must be trained if the waste in the pits is be RCRA hazardous. |
| | "Preparedness and Prevention"<br>IDAPA 16.01.05.008<br>(40 CFR 264 Subpart C) | Applies to construction of the soil cover of the monitoring system, and decontam activities if the waste in the pits is deter RCRA hazardous. |
| | "Contingency Plan and Emergency Procedures"<br>IDAPA 16.01.05.008<br>(40 CFR 264 Subpart D) | Applies to construction of the soil cover of the monitoring system, and decontam activities if the waste in the pits is deter RCRA hazardous. |
| | "Groundwater Protection Standard"<br>IDAPA 16.01.05.008<br>(40 CFR 264.92) | If the waste in the pits is determined to l hazardous through additional sampling a groundwater protection standards and a program must be established. |

**Table 9-2.** (continued).

| Citation | Reason |
|---|---|
| "Hazardous Constituents"<br>IDAPA 16.01.05.008<br>(40 CFR 264.93) | |
| "Concentration Limits"<br>IDAPA 16.01.05.008<br>(40 CFR 264.94) | |
| "Point of Compliance"<br>IDAPA 16.01.05.008<br>(40 CFR 264.95) | |
| "Groundwater Monitoring Requirements"<br>IDAPA 16.01.05.0084<br>(40 CFR 264.97) | |
| "Detection Monitoring Program"<br>IDAPA 16.01.05.008<br>(40 CFR 264.98(a-f)) | |
| "Equipment Decontamination"<br>IDAPA 16.01.05.008<br>(40 CFR 264.114) | All equipment used during construction<br>cover and installation of the groundwate<br>system must be decontaminated if hazar<br>contacted. |
| "Use and Management of Containers"<br>IDAPA 16.01.05.008<br>(40 CFR 264.171 – 177) | Applicable to any hazardous waste gene<br>construction of the soil cover and install<br>groundwater monitoring system that is r<br>containers. |
| "Closure and Post Closure Care of Landfills"<br>IDAPA 16.01.05.008<br>(40 CFR 264.310(a)(1-5) and<br>40 CFR 264.310(b)(1,4,5,6)) | If the waste in the pits is determined to l<br>hazardous through additional sampling a<br>design and maintenance requirements fo<br>cover and groundwater monitoring syste<br>met, and institutional controls imposed. |

**Table 9-2.** (continued).

| | Citation | Reason | Relevancy[a] |
|---|---|---|---|
| **To-Be–Considered** | | | |
| Interim Soil Lead Guidance for CERCLA Sites and RCRA Corrective Action Facilities | EPA Guidance Document. | | |
| Institutional Controls | Region 10 Final Policy on the Use of Institutional Controls at Federal Facilities | Applies to contamination left in place or remaining above 1E-04 risk. | |

a. A = applicable; RA = relevant and appropriate

NESHAPs = National Emission Standards for Hazardous Air Pollutants

IDAPA = Idaho Administrative Procedures Act

**Table 9-3**. ARARs for the Burn Pits (TSF-03 and WRRTF-01) contingent remedy.

| Category | Citation | Reason | Relevancy[a] |
|---|---|---|---|
| **Chemical-Specific ARARs** | | | |
| Rules for the Control of Air Pollution in Idaho | "Toxic Substances"<br>IDAPA 16.01.01.161 | The release of carcinogenic and noncarcinogenic contaminants into the air must be estimated before start of construction, controlled, if necessary, and monitored during soil and waste excavation, waste treatment if performed, and equipment decontamination. | A |
| | "Toxic Air Emissions"<br>IDAPA 16.01.01.585 and .586 | | |
| NESHAPs | "Radionuclide Emissions from DOE Facilities"<br>40 CFR 61.92 | Limits exposure of radioactive contamination release to 10 mrem/yr for the off-Site receptor, and establishes monitoring and compliance requirements. | A |
| | "Emission Monitoring"<br>40 CFR 61.93 | | |
| | "Emission Compliance"<br>40 CFR 61.94(a) | | |
| **Action-Specific ARARs** | | | |
| Rules for the Control of Air Pollution in Idaho | "Fugitive Dust"<br>IDAPA 16.01.01.650 and .651 | Requires control of dust during excavation and removal of waste from the pits. | A |
| Requirements for Portable Equipment | IDAPA 16.01.01.500.02 | Portable equipment for waste removal and treatment, if performed on-Site, and any portable support equipment must be operated to meet state and federal air emissions rules. | A |
| Resource Conservation and Recovery Act (RCRA) – Standards Applicable to Generators of Hazardous Waste | "Hazardous Waste Determination"<br>IDAPA 16.01.05.006<br>(40 CFR 262.11) | A HWD is required for soils and waste excavated for disposal and treatment (if required), and any secondary waste generated during remediation. | A |

**Table 9-3.** (continued).

| Category | Citation | Reason | Relevancy[a] |
|---|---|---|---|
| | "Manifest"<br>IDAPA 16.01.05.006<br>(40 CFR 262 Subpart B) | Establishes requirements for transporting hazardous waste to treatment and/or disposal site. | A |
| | "Pre-Transportation Requirements"<br>IDAPA 16.01.05.006<br>(40 CFR 262.30 – 262.33) | | |
| RCRA– Standards for Owners and Operators of Hazardous Waste Treatment Storage and Disposal Units | "General Waste Analysis"<br>IDAPA 16.01.05.008<br>(40 CFR 264.13 (a)(1-3)) | Analysis requirements apply to soils and waste excavated for treatment and/or disposal, and secondary waste generated during remediation. | A |
| | "Security of Site"<br>IDAPA 16.01.05.008<br>(40 CFR 264.14) | If the soils and/or waste in the pits is determined to be RCRA hazardous, then measures must be taken to restrict access to the site during soil excavation, waste removal, treatment, if performed, and equipment decontamination. | A |
| | "General Inspections"<br>IDAPA 16.01.05.008<br>(40 CFR 264.15) | If the soils and/or waste in the pits are determined to be RCRA hazardous, then regular inspections must be performed during remediation. | A |
| | "Personnel Training"<br>IDAPA 16.01.05.008<br>(40 CFR 264.16) | If the soils and/or waste in the pits are determined to be RCRA hazardous, then all personnel involved in soil and waste excavation, treatment if performed, and equipment decontamination must be trained. | A |
| | "Preparedness and Prevention"<br>IDAPA 16.01.05.008<br>(40 CFR 264 Subpart C) | If the soils and/or waste in the pits is determined to be RCRA hazardous, then these regulations will apply to soil and waste excavation, treatment, if performed, and decontamination activities. | A |
| | "Contingency Plan and Emergency Procedures"<br>IDAPA 16.01.05.008<br>(40 CFR 264 Subpart D) | If the soils and/or waste in the pits is determined to be RCRA hazardous, then these regulations will apply to soil and waste excavation, treatment, if performed, and decontamination activities. | A |

**Table 9-3.** (continued).

| Category | Citation | Reason | Relevancy[a] |
|---|---|---|---|
| | "Equipment Decontamination"<br>IDAPA 16.01.05.008<br>(40 CFR 264.114) | All equipment used during remediation must be decontaminated if hazardous waste is contacted. | A |
| | "Use and Management of Containers"<br>IDAPA 16.01.05.008<br>(40 CFR 264.171 – 177) | Applicable to any RCRA hazardous soils, waste, and secondary waste generated during remediation, which is managed in containers. | A |
| | "Staging Piles"<br>IDAPA 16.01.05.008<br>(40 CFR 264.554) | Applicable to any RCRA hazardous soils and waste from the pits that are to be staged in piles during remediation. | A |
| | "Miscellaneous Units (only if treatment is required to meet LDRs)"<br>IDAPA 16.01.05.008<br>(40 CFR Subpart X (except 264.603)) | Requirements for an on-Site treatment system for the soils and/or waste, if required. | A |
| RCRA – Land Disposal Restrictions | "LDR Treatment Standards"<br>IDAPA 16.01.05.011<br>(40 CFR 268.40(a)(b)(e)) | The waste in the pits must be treated if necessary, to meet LDR criteria before disposal. | A |
| | "Treatment Standards for Hazardous Debris"<br>IDAPA 16.01.05.011<br>(40 CFR 268.45(a)(b)(c)(d)) | | A |
| | "Universal Treatment Standards"<br>IDAPA 16.01.05.011<br>(40 CFR 268.48(a)) | | A |
| | "Alternative Treatment Standards for Contaminated Soil"<br>IDAPA 16.01.05.011<br>(40 CFR 268.49) | Applies to any RCRA hazardous soil that is to be removed from the pits for disposal at an approved facility on the INEEL or off the INEEL. | A |
| | "CERLCA Off-Site Policy"<br>40 CFR 300.440 | | A |

**Table 9-3.** (continued).

| Category | Citation | Reason | Relevancy[a] |
|---|---|---|---|
| **To-Be-Considered** | | | |
| Interim Soil Lead Guidance for CERCLA Sites and RCRA Corrective Action Facilities. | EPA Guidance | | |
| Institutional Controls | Region 10 Final Policy on the Use of Institutional Controls at Federal Facilities | Applies to contamination left in place or remaining above 1E-04 risk. | |

a. A = applicable; RA = relevant and appropriate.

NESHAPs = National Emission Standards for Hazardous Air Pollutants

IDAPA = Idaho Administrative Procedures Act

## 9.2 Fuel Leak

The Fuel Leak site (WRRTF-13) (see Figure 9-2) was contaminated by leaks from tanks and the associated piping. The tanks supplied diesel fuel and heating oil to buildings within the facility. Several tanks and the transfer lines, along with contaminated soil, were removed and disposed of in the early 1990s; the excavated areas were backfilled with clean soil. Some contamination remains in soil below and adjacent to several buildings currently in use. The estimated volume of contaminated soil within the top 3 m (10 ft) of soil is 300 $m^3$ (400 $yd^3$). Since the contamination is within the top 3 m (10 ft) of soil, the site may pose an imminent and substantial endangerment to human health and the environment.

Currently, the site is administratively controlled with signs that identify it as a CERCLA site. No activities can be performed at the site without contacting the INEEL Environmental Restoration Program. The purpose of these controls is to keep worker exposures ALARA, and to prevent the spread of contaminated soil.

### 9.2.1 Summary of Site Risks

A HHRA and an ERA were conducted for the Fuel Leak site. Calculation of numeric health risk values for the site COPCs was not possible because there is not toxicity data available. Instead, State of Idaho residential guidelines were used to determine the need for cleanup. If concentrations are greater than cleanup goals, then an imminent and substantial endangerment to human health and the environment is present. A detailed discussion of the methods used in the risk assessment process is presented in Section 6 of this ROD. Detailed information about the results of the Fuel Leak HHRA and ERA are presented in Sections 6 and 7 of the OU 1-10 RI/FS Report.

***9.2.1.1 Human Health Risks.*** None of the contaminants detected at the site have available human health toxicity information, so risks for the site were not calculated in the BRA. However, total petroleum hydrocarbon (TPH) concentrations at the site exceed the State of Idaho cleanup goal of 1,000 mg/kg TPH diesel.

***9.2.1.2 Ecological Risk Assessment.*** The average TPH diesel concentration at the Fuel Leak is 9,151 mg/kg. The HQs (>1.0) ranged from 2.2 for mammalian insectivores (e.g., Townsend big-eared bat) to 151 for mammalian insectivores (e.g., northern grasshopper mouse). The HQs for amphibians, birds, reptiles, and plants could not be determined because target risk values (TRVs) could not be derived for these receptors.

### 9.2.2 Summary of Alternatives

In accordance with CERCLA Section 121, the OU 1-10 FS identified and evaluated remediation alternatives. Any selected alternative had to achieve the remediation goal as outlined in the State of Idaho RBCA Guidance. The State of Idaho RBCA Guidance was enacted on January 1, 1997, and has superceded the old TPH cleanup guidance of 1,000 mg/kg TPH diesel, which was used in the OU 1-10 BRA. The principal ARAR evaluated for the Fuel Leak was the State of Idaho RBCA Guidance. In addition to the "No Action" alternative, four alternatives were evaluated to remediate the Fuel Leak site:

- Alternative 1: Limited Action
- Alternative 2: Containment

- Alternative 4: Excavation and Land Farming
- Alternative 5: In Situ Biodegradation using Bioventing.

Details of the alternatives considered and the evaluation process are included in Sections 10 and 11 of the OU 1-10 RI/FS and Sections 4 and 5 of the FS Supplement.

***9.2.2.1 Alternative 1: Limited Action.*** Under Alternative 1, existing management practices, including institutional controls and environmental monitoring would continue. The cost for this alternative is $1.4 million.

Alternative 1 would accomplish the site RAOs in a long timeframe because contamination would be left in place. To accomplish the RAOs, long-term institutional controls must be implemented to protect future occupational and residential land use. Institutional controls are a primary component of this alternative.

Alternative 1 would protect human health and the environment and comply with the regulations. Under Alternative 1, contamination would be left in place, resulting in low long-term effectiveness. Short-term effectiveness would be high, because workers would not be exposed to contaminants. This alternative would not reduce toxicity, mobility, or volume through treatment. Implementability would be high because the management practices are already in place.

***9.2.2.2 Alternative 2: Containment.*** Alternative 2 would cover the contaminated site with a native soil cover. The cover would consist of a layer of INEEL soil with surface vegetation. Institutional controls would be required to maintain the cover. The cost for this alternative is $1.6 million.

Alternative 2 would accomplish the site RAOs in a short timeframe because a cover can be constructed in a short time. To maintain the RAOs, long-term institutional controls must be implemented to protect future occupational and residential land use.

Alternative 2 would protect human health and the environment and would comply with the regulations. Contamination would be left in place; however, it would be contained, resulting in moderate long-term effectiveness. This alternative would not reduce toxicity, mobility, or volume through treatment; however, it would prevent the spread of contamination from the site. There would be a possibility for worker exposure during construction of the cover, reducing the short-term effectiveness. Implementability of this alternative would be low since the alternative could not be implemented until some time in the future when nearby buildings are removed.

***9.2.2.3 Alternative 4: Excavation and Land Farming.*** Under Alternative 4, the contaminated soil would be excavated down to approximately 3 m (10 ft) or to the maximum depth at which contaminant concentrations exceed FRGs, whichever is less. Sampling would be performed before excavation to determine what volume of contaminated waste must be removed, based on the State of Idaho RBCA Guidance. Clean soil would be used to backfill the site. The contaminated soil would undergo land farming at the CFA Land Farm. The cost for this alternative is $0.6 million.

Alternative 4 would accomplish the site RAOs in a short timeframe because contamination would be permanently removed. It is expected that no institutional controls would be required after the remedial action, but would be verified by confirmational sampling.

Alternative 4 would protect human health and the environment and would comply with the regulations. Long-term effectiveness would be high because the contaminants would be removed. There would be a possibility for worker exposure during excavation and transportation, reducing the short-term effectiveness. Land farming would reduce toxicity and mobility through treatment. Implementability would be moderate because the site is near existing buildings and structures, and the contamination is under an existing roadway and parking area. The cost of this alternative would be less than the cost of other alternatives considered at this site.

***9.2.2.4 Alternative 5: In Situ Biodegradation using Bioventing.*** Under Alternative 5, the contaminated soil would be remediated through in situ biodegradation. The toxic contaminants would be broken down through aerobic biodegradation by microorganisms naturally present in the soil. To increase the amount of oxygen available for aerobic activity, a network of bioventing wells would be installed. Air would be pumped into the bioventing system to stimulate faster biodegradation. The cost for this alternative is $1.9 million.

Alternative 5 would accomplish the site RAOs in a medium timeframe because contamination will be biologically broken down and reduced. It is expected that no institutional controls would be required after remedial action, but would be verified by confirmational sampling.

Alternative 5 would protect human health and the environment and would comply with the regulations. Long-term effectiveness would be high because the contaminants would be reduced or eliminated. The toxicity and volume would be reduced. Risks to workers and the environment would be moderate. Implementability would be high. The technology uses standard drilling and construction equipment, but additional site characterization will be required to design and implement the bioventing system. The cost would be greater than the other alternatives.

### 9.2.3 Summary of Comparative Analysis of Alternatives

The following sections summarize the evaluation of the candidate remedial alternatives according to the criteria identified in Section 7.1.3 of this ROD. Detailed comparative analyses can be found in Section 12 of the RI/FS and Section 5 of the FS Supplement. Section 6 of this ROD provides more detail on the individual CERCLA criteria.

***9.2.3.1 Threshold Criteria.*** The two threshold criteria, which must be satisfied by the selected remedy, are overall protection of human health and the environment and compliance with ARARs. All of the alternatives considered for the Fuel Leak (Alternatives 1, 2, 4, and 5) meet the threshold criteria.

***9.2.3.2 Balancing Criteria.*** The five balancing criteria are: (1) long-term effectiveness and permanence, (2) reduction of toxicity, mobility, or volume through treatment, (3) short-term effectiveness, (4) implementability, and (5) cost.

Alternatives 4 and 5 best satisfy the criterion of long-term effectiveness because contamination would be removed. Alternative 2 partially satisfies long-term effectiveness because contamination would be left in place, yet still contained. Alternative 1 least satisfies long-term effectiveness because contamination would be left in place. Reduction of toxicity, mobility, or volume through treatment is best satisfied by Alternatives 4 and 5; Alternative 4 reduces toxicity and mobility through land farming and Alternative 5 reduces toxicity and volume. The reduction criterion is least satisfied by Alternatives 1 and 2 because neither employs treatment. Alternative 1 best satisfies short-term effectiveness because workers will not be exposed to contamination. Alternatives 2, 4, and 5 only partially satisfy short-term effectiveness because of the possibility of worker exposure. Alternatives 1 and 5 best satisfy the

implementability criterion by using management practices already in place or standard techniques and equipment. Implementability is only partially satisfied by Alternative 4 because the site is near existing buildings and the contamination is under an existing roadway. Alternative 2 would least satisfy the implementability criteria because the alternative could not be implemented until nearby buildings are removed. Alternative 4 has the lowest estimated cost and Alternative 5 has the highest estimated cost.

***9.2.3.3 Modifying Criteria.*** The modifying criteria, used in the final evaluation of remedial alternatives, are state and community acceptance. State acceptance is demonstrated by IDHW concurrence with the selected remedial alternative and signature of this ROD. The IDHW was involved in the development and review of the RI/FS Report (DOE-ID 1997b), the Proposed Plans (DOE-ID 1998a and DOE-ID1998b), the FS Supplement (DOE-ID 1998c), this ROD, and other project activities such as public meetings.

For community acceptance, the factors that are considered include which elements of the alternatives interested persons in the community support, have reservations about, or oppose. The comments received on the Proposed Plan form the record of these opinions and concerns.

Generally, the selected remedy is supported; aspects that were questioned are effectiveness and the plan for phased implementation. The Responsiveness Summary (Part III) portion of this ROD documents the full range and content of the public comments received regarding the recommended action at this site.

### 9.2.4 Selected Remedy: Alternative 4, Excavation and Land Farming

Based on consideration of the requirements of CERCLA, detailed analysis of alternatives, and public comments, the Agencies selected Alternative 4, Excavation and Land Farming. The selected remedy will satisfy the NCP requirements by using treatment to address the low-level threat posed by the Fuel Leak. The major components of the selected remedy include:

- Sampling the Fuel Leak soil to determine risk-based remediation goals in accordance with the State of Idaho RBCA Guidance (*Risk-Based Corrective Action Guidance Document for Petroleum Releases)* and the Idaho Division of Environmental Quality Guidance (*Information Series # 7: Procedures for Land Treatment of Petroleum Contaminated Soils*), and determine land farming excavation volumes

- Excavating contaminated soil to a maximum of 3 m (10 ft) or the maximum depth that contaminant concentrations are above risk-based remediation goals in accordance with the State of Idaho RBCA Guidance (*Risk-Based Corrective Action Guidance Document for Petroleum Releases*), whichever is less

- Sampling to ensure contaminated soil exceeding remediation goals has been removed

- Treating the contaminated soil at the CFA Land Farm

- Backfilling excavated area with clean soil, including any stockpiled, then contouring and grading to surrounding soil.

The selected remedy addresses the risks posed by the Fuel Leak site by effectively removing the source of contamination, and thus, breaking the pathway by which a future receptor may be exposed. Because of data limitations from previous sampling efforts and corresponding uncertainties in the risk evaluation, additional sampling will be performed before excavation. The data obtained from this

sampling effort will be evaluated against the Idaho RBCA Guidance to determine the actual risk based remediation goal, and to determine the volume of contaminated soil that must be excavated and land farmed.

Under Alternative 4, the contaminated soil will be excavated down to 3 m (10 ft) or the depth at which contaminant concentrations exceed the remediation goal to be determined from the State of Idaho RBCA Guidance, whichever is less. Confirmation sampling will be performed to ensure that all contaminated soil exceeding the FRG has been removed. The contaminated soil will be transported to the CFA Land Farm to undergo land farming, and the excavation will be backfilled with clean soil.

Based on the results of post remedial action sampling, institutional controls may be required. The controls, if necessary, will provide unrestricted land use in 100 years and will undergo 5-year reviews, as discussed in Section 10. Additional institutional control information is in Section 12. Some changes may be made to the remedy as a result of the remedial design and construction process that result from the engineering design process.

***9.2.4.1 Estimated Costs for the Selected Remedy.*** The estimated capital and maintenance cost for implementing the selected remedy for the Fuel Leak is $572,927. The costs are presented in net present value, which allows for equal comparison of long-term and short-term alternatives while factoring in inflation. Details of the cost estimates are presented in Appendix J of the RI/FS report and summarized in Table 9-4.

***9.2.4.2 Protection of Human Health and the Environment.*** This alternative would provide for long term overall protection of human health and the environment. The removal of petroleum contaminated soils to a depth of 3 m (10 ft) bgs would eliminate potential long-term human health and environmental exposures to the site's contamination. As a result, this alternative would satisfy the specified RAOs for the site.

***9.2.4.3 Compliance with ARARs and TBCs.*** The selected remedy meets the identified ARARs, as shown in Table 9-5.

***9.2.4.4 Cost Effectiveness.*** The selected remedy is cost-effective because it provides overall effectiveness in meeting the RAOs proportionate to its costs. When compared to other potential remedial actions, the selected remedy provides the best balance between cost and effectiveness in protecting human health and the environment.

**Table 9-4.** Cost estimate summary for the Fuel Leak (WRRTF-13) selected remedy.

| | | $ Fiscal Year (FY)-97 |
|---|---|---|
| FFA/CO Management and Oversight | | |
| | WAG 1 – Management | 212,778 |
| Remediation Oversight | | |
| | Construction Oversight | 13,769 |
| | Construction Project Management | 22,948 |
| | Remedial Action Document Preparation | 24,233 |
| | Remedial Action Report | 10,880 |
| | Packaging, Shipping, Transportation Documentation | 19,512 |
| | WAG-Wide Remedial Action 5-Year Review | N/A |
| Remedial Design | | |
| | Title Design Construction Document Package | 19,920 |
| | Remedial Design Documentation per WAG 1 Baseline | 31,928 |
| | Prefinal Inspection Report | 8,000 |
| Remedial Action | | |
| | Site Preparation | 10,000 |
| | Excavate and Transport Contaminated Soil to Land Farm | 19,000 |
| | Dispose of Treated Soil | 11,400 |
| | Clean Fill and Reseeding | 24,840 |
| | Sampling and Analysis of Soil | 5,000 |
| | Subcontractor Indirect Costs | 45,189 |
| CAPITAL COST SUBTOTAL | | 479,397 |
| | Contingency @ 30% | 143,819 |
| TOTAL CAPITAL COST IN FY-97 DOLLARS | | 623,216 |
| TOTAL CAPITAL COST IN NET PRESENT VALUE | | 572,927 |
| Operations | | |
| | WAG 1 – Management | N/A |

**Table 9-4.** (continued).

| | | $ Fiscal Year (FY)-97 |
|---|---|---|
| | Annual Operation and Maintenance Reports | N/A |
| Decontamination and Dismantlement | | N/A |
| Surveillance and Monitoring | | N/A |
| OPERAITON AND MAINTENANCE (O&M) COST SUBTOTAL | | N/A |
| | Contingency @ 30% | N/A |
| TOTAL O&M COST IN FY-97 DOLLARS | | N/A |
| TOTAL O&M COST IN NET PRESENT VALUE | | N/A |
| TOTAL PROJECT COST IN NET PRESENT VALUE | | 572,927 |

**Table 9-5.** ARARs for the Fuel Leak (WRRTF-13) selected remedy.

| Title | Citation | Reason | Relevancy[a] |
|---|---|---|---|
| **Chemical-Specific ARARs** | | | |
| Rules for the Control of Air Pollution in Idaho | "Toxic Substances" IDAPA 16.01.01.161<br><br>"Demonstration of Preconstruction Compliance with Toxic Standards" IDAPA 16.01.01.210<br><br>"Toxic Air Emissions" IDAPA 16.01.01.585 and .586 | The release of carcinogenic and noncarcinogenic contaminants into the air must be estimated before start of excavation, controlled, if necessary, and monitored during remediation. | A |
| Idaho Groundwater Quality Rule (Primary Drinking Water Standards) | IDAPA 16.01.11.200 (40 CFR 141) | Any contamination remaining at the site after remediation must not adversely affect groundwater quality; groundwater quality standards must be met. | A |
| Petroleum Release Response and Corrective Action (RBCA) | IDAPA 16.01.02.852 | After additional sampling, an analysis based on the Idaho RBCA criteria will be performed to determine the cleanup criteria for the petroleum contaminated soils. | A |
| Resource Conservation and Recovery Act (RCRA) – Identification and Listing of Hazardous Waste | "Exclusions" IDAPA 16.01.05.005 (40 CFR 261.4(b)(10)) | Any excavated soils that fail TCLP for organics (D018-D043) will not be considered hazardous waste. | RA |
| **Action-Specific ARARs** | | | |
| Rules for the Control of Air Pollution in Idaho | "Fugitive Dust" IDAPA 16.01.01.650 and .651 | Requires control of dust generated during excavation and transport of soil. | A |
| RCRA– Standards Applicable to Generators of Hazardous Waste | "Hazardous Waste Determination" IDAPA 16.01.05.006 (40 CFR 262.11) | A HWD must be made for any waste generated during excavation. | A |

| Title | Citation | Reason | Relevancy[a] |
|---|---|---|---|
| **To-Be-Considered** | | | |
| Institutional Controls | Region 10 Final Policy on the Use of Institutional Controls at Federal Facilities | Applies to contamination left in place or remaining above 1E-04 risk. | |

a. A = applicable; R = relevant and appropriate

IDAPA = Idaho Administrative Procedures Act

TCLP = toxicity characteristic leaching procedure